

***NCDOT***  
***B-20 BIODIESEL & E-85 FUELS***  
***CASE STUDY***

**By**

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# ***OVERVIEW***

- ***History of NCDOT's Alternative Fuels Program***
- ***Lessons Learned***
- ***The future of our program***
- ***Fleet size and composition***

# ***FLEET SIZE AND COMPOSITION***

- ***Approximately 23,000 Light & Heavy “Core”  
Pieces of Construction Equipment***
- ***11,625 “On & Off Road” Rolling Stock***
  - 7,075 Diesel/Bio-diesel Units***
  - 3,700 E-10 Ethanol/Unleaded Gasoline***
  - 850 E-85 Ethanol***

# ***HISTORY OF B-20 USE***

- *Began using B-20 in 1994 as a result of Clean Air and Energy Act mandates for public fleets.*
- *Initially limited use to 3 of 14 Highway Divisions.*
- *One Division from each region: Coastal, Piedmont, and Mountain areas.*
- *By 2003 the program was expanded to 6 of the 14 Highway Divisions. In 2006, expanded statewide.*
- *In normal years, NCDOT will use 11,000,000 gallons of B-20.*

# ***HISTORY OF E-85 USE***

- *Experimented with E-85 in Wilmington in 2004. Did not have enough flex fuel trucks to keep fuel rotated.*
- *Installed a new site in Greenville in November, 2009.*
- *Awarded contract to install 4 E-85 sites in Marion, Charlotte, Asheboro, and Hillsboro.*

# *Lessons Learned*

## *Things To Do*

### ***1. Tank & Dispenser***

- Filter at dispensing units. Filter casing cost \$100 per site. Use a 10 micron Viotech hydorglass filter designed to remove particulate matter and water. Changed every 4-6 weeks. Cost \$14.00 each.***
- 114 diesel and 114 gasoline tanks installed 25+ years ago. Recommend cleaning tanks prior to introduction of Biodiesel or E-85.***

# *Lessons Learned*

## *Things To Do*

### **2. Equipment**

- *Change the fuel filter following the first tank's use of B-20. Bio-diesel acts to clean fuel residue that accumulates over years of regular diesel use. Will clog filters. Once cleaned, filtration will be normal.*

# *Lessons Learned*

## *Things To Do*

### **3. Contracts**

- Include BQ 9000 as a requirement. Insures the producer has a QA/QC program.*
- Include requirement for fuel provider to be responsible for all additives; ie, cold flow, algaecide, etc.*
- Include ASTM 6751 compliance.*



# *Lessons Learned*

## *Things To Do*

### 3. *Contracts (cont'd)*

- Include a warranty/insurance clause requiring provider to replace contaminated fuel and clean tanks. We include a penalty of \$1,500 per occurrence.*
- From March to September we allow several types of feedstock. From October to February we restrict feedstock to virgin soy.*

# *Lessons Learned*

## *Things To Do*

### 4. Education

- Prepare Management. We met with the Secretary and his Deputies to educate them on the precautions taken to insure the best chance for success.*
- Prepare Technicians. We met with our Equipment Superintendents who are responsible for keeping the fleet operational.*
- Prepare Users. We met with Division management to explain requirements and benefits. Became a topic of discussion at safety meetings.*

# *Lessons Learned*

## *Things To Do*

### 4. *Education (cont'd)*

*- Prepare Purchasing. Make sure they understand the reason for the specifications. Vendors may challenge the need for BQ9000 as well as other requirements.*

*- Prepare Fuel Vendors. Make sure they understand the requirements and the consequences for not adhering to those requirements.*

# *Lessons Learned*

## *Things To Avoid*

### 1. *Tanks and Dispensers*

*- Allowing Biodiesel to sit for more than 120 days & E-85 to sit for more than 90 days in supply tanks.*

### 2. *Equipment*

*- Allowing fuel to sit in equipment for longer than recommended period of time. Examples: Standby generators, portable light plants, message boards.*

### 3. *Contracts*

*- Allowing the use of beef tallow and palm oil as feedstock for bio-diesel. The cold flow point for these are approximately 60 degrees Fahrenheit.*

# *Questions*

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